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BAINECHINA ROSSIAE GEN. ET SP. NOV. (NEMATODA : SEURATIDAE) FROM AUSTRALIAN DASYURID MARSUPIALS

by LESLEY R. SMALES[1]

Summary

SMALES, L. R. (1999) *Bainechina rossiae* gen. et sp. nov. (Nematoda : Seuratidae) from Australian dasyurid marsupials. *Trans R. Soc. S. Aust.* **123**(1), 37-41, 31 May, 1999.

Bainechina rossiae gen. et sp. nov. (Seuratidae : Echinonematinae) is described from the stomach and small intestine of the dasyurid marsupials *Planigale gilesi*, *P. ingrami*, *P. maculata* and *Sminthopsis macroura*. It resembles *Seurechina* spp. most closely in body armature but can be distinguished from this genus in having a triangular not dorso-ventrally elongated mouth opening, having neither sclerotised rings between the pharynx and mouth opening, nor caudal alae into which caudal papillae extend nor peri-cloacal papillae. *Bainechina rossiae* is unique among the echinonematines in having papillae on the body at the level of the vulva. A key to the genera is given. Aspects of the life-cycle of *B. rossiae* are discussed.

KEY WORDS: *Bainechina*, nematodes, Seuratidae, Echinonematinae, marsupials, Dasyuridae, Australia.

Introduction

Nematodes of the family Seuratidae are parasites of reptiles, birds, rodents, bats and Australian marsupials (Chabaud 1978). All of the Australian species are contained within the subfamily Echinonematinae and are found in dasyurid or peramelid marsupial hosts. There are four genera, characterized by a large triangular or dorso-ventrally elongated mouth opening with no lip lobes, an anterior extremity with or without a swollen cephalic bulb bearing hooks, a short, simple pharynx, long slender spicules without alae, no pre-cloacal sucker on the male and the cloacal region covered by small cuticular granulations.

Linstowinema Smales, 1997 and *Inglechina* Chabaud, Seureau, Beveridge, Bain & Durette-Desset, 1980 contain species with a swollen cephalic bulb bearing three rows of large hooks whereas species of *Chabaudechina* (Smales in press) have five rows of hooks. These three genera all have a triangular mouth opening. *Seurechina* Chaubaud, Seureau, Beveridge, Bain & Durette-Desset, 1980 by contrast, has a dorso-ventrally elongated mouth opening and has neither a swollen cephalic bulb nor cephalic hooks.

Materials and Methods

Specimens dissected from dasyurids from the CSIRO Wildlife and Rangelands Collection (CSIRO) were fixed in hot 10% fomalin and then stored in 70% ethanol. Specimens from Blair Athol Mine, Central Queensland and Yabula near Townsville, North Queensland, dissected from dasyurids that had been fixed in 10% formalin, were stored in 70% ethanol. Specimens were examined after clearing in lactophenol. Measurements, in micrometres unless otherwise stated, were made with the aid of a drawing tube and map measurer or an ocular micrometer. Drawings were made with the aid of a drawing tube. Type specimens have been deposited in the South Australian Museum, Adelaide (SAMA). Voucher specimens are held in the Western Australian Museum, Perth (WAMP) and CSIRO, Canberra.

Systematics

Family Seuratidae (Hall, 1916) Railliet, 1916
Subfamily Echinonematinae Inglis, 1967

Bainechina gen. nov.

Anterior end without lips or lip-like structures, bearing 2 pairs of double sub-median papillae, single pair of lateral amphids. Mouth opening triangular in outline. Cephalic region without spines or hooks, remainder of body covered with numerous rows of hooks or spines. Hooks on pharyngeal region becoming smaller, grading into spines towards posterior. Armature extending over entire body of female, terminating anterior to cloaca of male. Short, simple claviform pharynx surrounded by nerve ring anterior to deirids. Deirids simple, conical. Spicules equal, similar, without alae. Vulva

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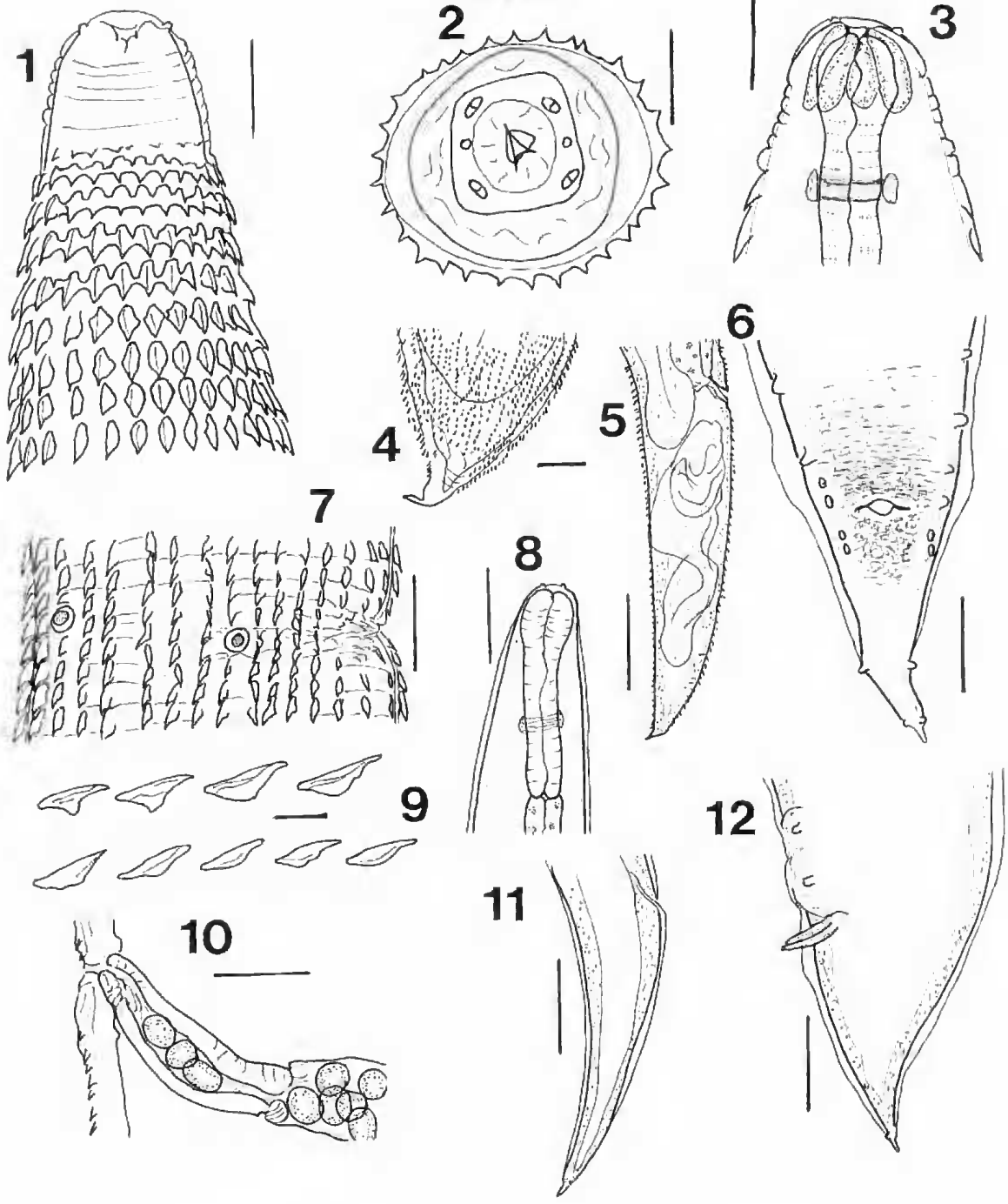

Figs 1–12. *Bainechina rossiae* gen. et sp. nov. 1. Anterior end (lateral view). 2. Anterior end (*en face* view). 3. Anterior end, optical section showing laminae (lateral view). 5. Female tail (lateral view). 6. Male posterior end (ventral view). 7. Female mid-body showing papillae and vulva (left lateral view). 8. Larva, anterior end (lateral view). 9. Body hooks (lateral view). 10. Vagina (right lateral view). 11. Larva, posterior end (lateral view). 12. Male, posterior end (lateral view). Scale bars = 100 μm 1, 10; 50 μm 2, 3, 6, 7, 8, 11, 12; 25 μm 4, 9; 200 μm 5.

at mid-region of body: monodelphic, vagina directed posteriorly. Parasites of Australian dasyurid marsupials.

Bainechina rossiae sp. nov.
(FIGS 1-12)

Holotype: ♂, from small intestine of *Planigale maculata* (Gould, 1851), Yabulu near Townsville, Queensland (19° 11' S, 146° 36' E), October 1997, coll. W. Houston, SAMA AHC 31286.

Allotype: ♀, same data, SAMA AHC 31287.

Paratypes: 5 ♂♂, same data, SAMA AHC 31288.

Other material examined: From *Planigale maculata*, Queensland: 5 ♀♀ Yabulu, AHC 31289, AHC 31290, 3 ♀♀ Blair Athol Mine site, AHC 31291, AHC 31292; Western Australia: 2 ♀♀ Mitchell Plateau, WAMP 47-98, 48-98. From *Planigale gilesi* Aitken, 1972, New South Wales: 1 ♂ Chinamans Lake, CSIRO N4409. From *Planigale ingrami* (Thomas, 1906) Northern Territory: 2 ♀♀, 4 larvae, Smithburne River, CSIRO N2116. From *Sminthopsis macroura* (Gould, 1845), Queensland: 1 ♂, 2 ♀♀ Julia Creek, SAMA AHC 31293.

Description

Small worms, with the characters of the genus. Body with fine cuticular annulations. Cephalic extremity without hooks or spines, remainder of body with rows of hooks, at each annulation, extending over entire body of female, 80% of body of male. Body hooks becoming biggest at about row 10, decreasing in size posteriorly, grading into spines. Thirty hooks in first row, 45 hooks on mid-body rows on female. Pharynx surrounded at anterior end by 4 pairs of laminae approximately 100 long. Pharynx simple, claviform, terminating at level of about 10th row of hooks, approximately $^1/_8$-$^1/_{12}$ body length. Nerve ring surrounding pharynx, deirids posterior to nerve ring, secretory-excretory pore not seen.

Male: (measurements Table 1).

Nerve ring, deirids, secretory-excretory pore not seen. Spicules equal, similar, without alae $^1/_7$ body length. Gubernaculum not seen. Eight pairs caudal papillae, 4 pairs lateral pre-cloacal, 2 pairs lateral post-cloacal, 2 pairs near tail tip. Narrow caudal alae extending from anterior caudal papillae posterior to cloaca. Cuticular embossing surrounding cloaca. Tail ending in prominent tip.

Female: (measurements Table 1).

Secretory-excretory pore not seen. Four papillae; 1 left lateral, 1 right lateral, 2 dorsal encircle body at level of vulva. Vagina directed posteriorly; monodelphic. Tail ending in prominent spike. Eggs oval 36–43 (39) by 33–36 (34).

Larvae: (measurements Table 1).

Cuticle aspinous. Tail ending in prominent spike.

TABLE 1. *Measurements of* Bainechina rossiae *sp. nov. from* Planigale *spp. Female measurements given as range, mean and standard deviation.*

	Holotype Male	Male from *P. gilesi*	Females n=40	Larvae n=4
Length	1.9 mm	2.3 mm	4.0-6.5, 5.5 ± 0.81 mm	1225
Max. width	270	235	340-410, 380 ± 48.54	87
Pharynx length	305	260	360-535, 460 ± 51.37	110
Anterior to nerve ring			80-100, 90 ± 9.80	80
Anterior to deirids			90 (n=1)	
Spicule length	460	560		
Vulva to posterior			2700-3400, 3100 ± 282.89	
Tail	94	135	48-740, 640 ± 104.00	160
Vagina			180-250, 215 ± 40.41	

Etymology

Generic name in honour of Dr O. Bain coupled with the Greek *echinos* (hedgehog, sea-urchin) following the form used by Chabaud *et al.* (1980) for other echinonematine genera; specific name after a colleague, Dr P. Rossi.

Remarks

The two females from *P. ingrami* (Thomas, 1906) were smaller (3.4–3.6 mm) compared with females from *P. maculata* (4-6.5 mm) and had shorter tails (150, 165 compared with 480-740). No mature eggs were observed in the uterus and so these differences in size might be due either to the immaturity of the worms or to differences in the fixation procedures used. Since no male specimens were available for study and the body armature of the females was the same as that for specimens from *P. maculata* they are considered, at present, to be the same species.

The females from *Sminthopsis macroura* (Gould, 1858) were larger (7.15 mm long compared with 4-6.5 mm) but the male (2 mm compared with 1.9-2.3 mm) was similar in size to specimens from *P. maculata*. All the specimens from *S. macroura* had characters consistent with *B. rossiae* and are considered to be the same species.

Inglis (1967) distinguished between pairs of papillae and a pair of phasmids on the posterior extremity of the tail of *Linstowinema*. Other echinonematine genera have three or four pairs of papillae and a pair of phasmids in this position (Chabaud *et al.* 1980; Smales 1999, in press; Smales & Rossi 1999). It is not clear whether the two pairs of papillae seen on the posterior extremity of the tail of *B. rossiae* represent a pair of papillae and a pair of phasmids or whether the phasmids were not seen.

Bainechina gen. nov. clearly belongs in the Echinonematinae because it has an anterior end with a triangular mouth opening, no lip lobes and two pairs of double cephalic papillae. It has relatively long (¼ body length) simple spicules and cuticular embossing around the cloaca. In body armature it is most similar to the genus *Seurechina*, in not having a swollen cephalic bulb with large cephalic hooks but in having rows of small hooks and spines at each cuticular annulation over the remainder of the body surface. Both genera have four pairs of laminae at the anterior end surrounding the pharynx, possibly with a role in holding the cervical spines steady when they are embedded in the intestinal mucosa (Chabaud *et al.* 1980; Smales 1998). *Bainechina* can be differentiated from *Seurechina* in having the mouth opening triangular not dorso-ventrally elongated and in not having sclerotised rings, enlarged dorsally and ventrally, capping the anterior end of the pharynx (Chabaud *et al.* 1980). *Bainechina rossiae* has eight pairs of caudal papillae, none of which extends into the caudal alae as do those of *Seurechina* spp. (Chabaud *et al.* 1980; Smales 1998). None of the caudal papillae of *B. rossiae* is peri-cloacal whereas three pairs of caudal papillae are peri-cloacal in *Seurechina* spp. (Chabaud *et al.* 1980; Smales 1998). None of the other genera within the Echinonematinae has papillae at the level of the vulva.

Of the other echinonematines, *Bainechina* differs from *Linstowinema* and *Inglechina* in not having a swollen cephalic bulb with three rows of cephalic hooks (Chabaud *et al.* 1980; Smales 1997, 1999; Smales & Rossi 1999). *Bainechina* also differs from *Chabaudechina* with five rows of cephalic hooks (Smales in press). The arrangement of caudal papillae in *Bainechina* is also unique to the genus.

Key to the genera of the Echinonematinae

1. With cephalic hooks on cephalic bulb, without laminae ..... (2)
   Without cephalic hooks on cephalic bulb, with four pairs laminae (Fig. 3) ..... (4)
2. Three rows of hooks on cephalic bulb ..... (3)
   Five rows of hooks on cephalic bulb ..... *Chabaudechina*
3. Rows of hooks on anterior region of body ..... *Linstowinema*
   Without body hooks ..... *Inglechina*
4. Mouth opening oval ..... *Seurechina*
   Mouth opening triangular ..... *Bainechina*

Discussion

The larval stages recovered from the lungs of *Planigale ingrami* (Thomas, 1906) had pharyngeal and cephalic morphology indicative of *Bainechina* (Fig. 8). Their recovery from the lungs, together with the lack of any sexual differentiation suggests that they were third or early fourth stage larvae undergoing migration to the digestive tract before moulting to fourth or fifth, sub adult stage nematodes. Spines were not observed on the body cuticle of these larvae, as has been noted on fourth stage larval *Linstowinema* and *Inglechina* (Smales 1999; Smales & Rossi 1999), possibly indicative of their being at a less advanced stage of development. *Linstowinema cinctum* (Linstow, 1898), the only species in which the life cycle has been studied, develops into an infective third stage larva in experimentally infected Orthoptera (Chabaud *et al.* 1980). Dasyurids presumably

become infected after eating infected arthropods. There has, however, been no record of larval migration within the definitive host, as inferred in this study, for any of the Seuratidae (Anderson 1992).

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